Scottish Wildlife Trust

Policy

Geodiversity

Policy Summary

Scottish Wildlife Trust will promote the conservation of Geodiversity through its work on its reserves and its support for the Regionally Important Geological and Geomorphological Sites system (RIGS).

Policy Statement

1. Scottish Wildlife Trust recognises Geodiversity as an essential component of our natural heritage.
2. Scottish Wildlife Trust believes that land management practices should recognise conservation of geodiversity as a major aim and attribute high value and importance to this.
3. Scottish Wildlife Trust will promote education about Geodiversity by raising awareness by means of interpretation on appropriate Reserves and through the promotion of 'Rockwatch', the Wildlife Watch club for young geologists.
4. Scottish Wildlife Trust will promote the conservation of Geodiversity through its work on its reserves and its support for the Regionally Important Geological and Geomorphological Sites system (RIGS).

Context

The geological story of Scotland is all around us in our rocks, soils, landforms, landscapes and active processes. These physical components of the natural heritage, the Geodiversity, are closely linked to biological components of the natural heritage, biodiversity, through the relationship between rocks, soils, habitats and species. The relationship is fundamental - most habitats cannot exist without the supporting medium of soils, and soil cannot form without weathering processes acting on the underlying subsoils and rocks.

Rocks, soils and landforms are resources that provide essentials for life. These include water, raw materials for manufacturing and construction, soil for agriculture, land for recreation, and coal, oil and gas for energy. They also support habitats and species, and so are vital for the Earth's biodiversity.

Geodiversity is a dynamic subject - not just old rocks. Animals and plants that are growing today, plants decaying to form peat bogs, and soil washed off the fields during storms are parts of the processes of creating rocks of the future. These processes of rocks first supporting soil development then plant and animal growth, which then decay and become part of the soil and rock formation cycle, are parts of the biodiversity cycle of life. Habitats and species (both now and in the future) cannot exist without this cycle.

Maintaining Geodiversity is as important as maintaining biodiversity, since both are fundamentally linked.

Regionally Important Geological and Geomorphological Sites (RIGS), identified by locally developed criteria, are currently the most important places for geology and geomorphology outside statutorily protected land such as Geological Sites of Special Scientific Interest (GSSSI). The designation of RIGS is one way of

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recognising and protecting important Earth science and landscape features for future generations to enjoy. There are currently five RIGS Groups operating in Scotland covering 11 of the 32 Scottish Local Authorities. The Groups are composed of professional and amateur geologists, planners, teachers, museum specialists and representatives from the British Geological Survey, Scottish Natural Heritage, Scottish Landowners Federation, Historic Scotland, and Local Biodiversity Action Plan groups.

RIGS are equivalent to local Wildlife Sites and other non-statutory wildlife designations. They have started to be listed in local authorities' development plans and shown on "alert maps". RIGS can be protected through the planning system if a RIGS group recommends sites to the local planning authority. Conservation and management of sites will usually depend upon agreements and co-operation with landowners. RIGS are described and their use by the planning system encouraged in National Planning Policy Guideline 14: Natural Heritage (Scotland, 1999) produced by the Scottish Executive.

SWT Strengths and priorities for action

Scottish Wildlife Trust's Memorandum of Association states that an object of the Trust is "To record and study places and objects of ….geological…or scientific interest or natural beauty or to arrange by agreements with owners or otherwise to protect from injury or destruction." And also "To protect, organise and encourage study and research for the advancement of knowledge in the natural sciences…".

Although there are no specific targets relating to it within the Corporate Strategy, Geodiversity and its maintenance have to be considered when implementing a number of Corporate Strategy priorities.

Wildlife Reserves (Corporate Strategy Priority 1)

At least 17 current Scottish Wildlife Trust reserves have major Geological or Geomorphological special interest within them (see appendix 2), alongside their Biological interest. It is desirable that greater effort is made on such reserves to highlight this geodiversity interest. Reserves staff and volunteers should take full account of the way geodiversity affects the landscape and wildlife of Trust reserves, particularly during the completion of management plans. Management plans should fully consider whether geodiversity conservation techniques are appropriate for use on a particular reserve.

In order that staff and volunteers can take better account of geodiversity concerns, action is desirable in two areas – awareness raising and training. Awareness of geodiversity techniques and principles should be raised throughout the Trust and this can be achieved in a variety of ways. Similarly, reserves staff and volunteers should be trained in geodiversity management techniques, such as specialised training from an external provider, site visits to appropriate geological/geomorphological sites and through receiving relevant publications.

Designated Sites and Wildlife Sites (Corporate Strategy Priority 2)

Many Wildlife Sites have Geodiversity interest, and for some the wildlife interest is a direct result of the underlying geology. However, since the early 1990s it has been agreed that Scottish Wildlife Trust would not assess and designate local Geodiversity sites that were of purely geological interest. Instead the process would be devolved to the growing UK RIGS (Regionally Important Geological Sites) system, co-ordinated and initially funded by the Royal Society for Nature Conservation.

In Scotland the RIGS system currently has 5 RIGS local committees made up of Geoscience specialists. They have so far designated, and had accepted by the Local Authorities, 18 RIGS throughout Scotland with others in the pipeline.

However, the lobbying for Local Authority and other protection and of RIGS was not devolved, as there are no other NGOs in Scotland that argue nationally for the defence of RIGS once designated. That task remains with Scottish Wildlife Trust under its Articles of Memorandum and it has the geological advice available to it to carry out this task. It currently does this through its involvement in the planning system and when Wildlife

Sites are promoted and protected in Local plans RIGS where identified are included and argued for to the same level of planning protection at the same time.

Education and Lifelong Learning (ELLL) (Corporate Strategy Priority 7)

As geodiversity and biodiversity are fundamentally linked, then ELLL plays a key role within SWT in raising awareness accordingly. This can be achieved through articles on geodiversity in Trust magazines and the production of information sheets on geological and geomorphological conservation, through lectures and workshop at Trust conferences and seminars, through organising appropriate training events and through the promotion of a geodiversity theme at events.

In our Corporate and Interpretative Strategies, we make a commitment to visitors on reserves and to interpretation on key reserves. As a number of Trust reserves have geological or geomorphological special interest, then any interpretation implemented should recognise this interest. Geodiversity demonstration sites can be established and promoted widely using appropriate reserves and a catalogue of reserves with geological or geomorphological importance should be created.

Our ELLL programmes at reserves, Visitor Centres and at events should, where appropriate, have a geodiversity element to them. Geodiversity is already well promoted to our junior membership, Wildlife Watch, through 'Rockwatch', the Geologists Association club for young geologists. This can also be adapted for use by school groups, through our Watch Education Service, and by older young people, through our Greenwatch programme.

Links to other SWT policies

This policy should be read in conjunction with the following SWT policies:

- Wildlife Sites
- Landscape and Wildlife Reserves
- National Parks
- Access to Wildlife Reserves
- Acquisition, Review and Disposal of Wildlife Reserves

References

References are listed in the appendices attached.

Date of approval of policy by Council

This policy was approved by Council on 11th March 2002.

Appendices

Appendix 1: Scottish Biodiversity Group paper on Geodiversity
Appendix 2: A review of the geological interest of current SWT reserves
Appendix 3: A development strategy for the RIGS movement in Scotland 2000-2005

Appendix 1

Scottish Wildlife Trust Policy on Geodiversity and the Conservation of Geology and Geomorphology

SCOTTISH BIODIVERSITY GROUP

Local Biodiversity Action Plans in Scotland
Sector Guidance Note 1

GEODIVERSITY

Summary
This guidance note explains the link between the physical components of the natural heritage represented by rocks, soils, landforms and active physical processes, and the biological components of the natural heritage represented by biodiversity and biological processes. Landscape and soils are the bridges that link the physical to the biological world. This note focuses on the relationships between:

- **features and processes of the physical Earth, and its species and habitats;**
- **the physical Earth, biodiversity and sustainable development.**

Introduction

The geological story of Scotland is all around us in our rocks, soils, landforms, landscapes and active processes. These physical components of the natural heritage, the geodiversity, are closely linked to biological components of the natural heritage, biodiversity, through the relationship between rocks, soils, habitats and species. The relationship is fundamental - most habitats cannot exist without the supporting medium of soils, and soil cannot form without weathering processes acting on the underlying subsoils and rocks.

Rocks, soils and landforms are resources that provide essentials for life. These include water, raw materials for manufacturing and construction, soil for agriculture, land for recreation, and coal, oil and gas for energy. They also support habitats and species, and so are vital for the Earth's biodiversity.

Geodiversity is a dynamic subject - not just old rocks. Animals and plants that are growing today, plants decaying to form peat bogs, and soil washed off the fields during storms are parts of the processes of creating rocks of the future. These processes of rocks first supporting soil development then plant and animal growth, which then decay and become part of the soil and rock formation cycle, are parts of the biodiversity cycle of life. Habitats and species (both now and in the future) cannot exist without this cycle.

Maintaining geodiversity is as important as maintaining biodiversity, since both are fundamentally linked.

Scotland's geological history

Scotland is made up of rocks which have formed over millions of years. Some of the oldest rocks in the Highlands were formed about 3 billion years ago when Scotland sat near the South Pole. Over

time, the Scottish landmass drifted north towards the equator. Our coal reserves formed around 300 million years ago. At this time Scotland was sitting at the equator, covered in forests and enjoying a tropical climate. It must have seemed like a greenhouse: the atmosphere at this time contained nearly twice as much carbon dioxide than it does today. As Scotland 'drifted' northwards, red sandstone rocks formed whilst we passed through the northern desert belt.

The dynamic earth forces that drove Scotland north across the globe produced heat and pressure and caused earthquakes and volcanoes. These forces folded, faulted, cooked and stewed our rocks and produced volcanoes such as Edinburgh's Arthur's Seat. Many of the rocks altered or produced by these forces are hard and resistant to erosion. They thus have a strong influence on our landscape.

The rocks that underlie the surface are sometimes exposed on hillsides, in coastal cliffs, in river banks and in artificial excavations such as quarries and road cuttings. Rocks can also be seen in building stones, giving areas their own local architectural distinctiveness. The effects of past land-uses such as mining or quarrying can seem an eyesore, but may provide excellent habitats especially for pioneer species, and have good restoration potential. Quarries also provide excellent locations for recreation and earth heritage interpretation. Some locally distinctive habitats such as the orchids, lycopodium and staghorn mosses on North Addiewell bing in West Lothian, are directly related to mineral extraction.

Landscape, glacial landforms and associated sediments

Scotland has been covered by thick ice many times in its history. Moving ice rounded the hills and scratched and polished the rocks. It also created the wide straths and glens that today have small 'misfit' streams within them. As ice shaped the existing rocks, it left behind the eroded material (i.e. 'subsoils') as heaps of sand and gravel on the floodplains. These deposits often have distinctive terraced or mound shapes and can be very important for habitat. They are also an important economic resource. However, because the processes that formed them are no longer active, they are a finite resource that cannot be re-created. In the coastal zone, the melting ice left sea levels up to 45 m higher than present. This has left old shorelines inland, well above the current coast.

Active processes

The surface of our land is constantly changing. Slopes move, rivers erode and waves reshape the coastline. Sudden events like flooding can create problems for land managers. However, they are an important part of the natural cycle and are vital for the formation of some habitats. These include pools in rivers for adult Atlantic salmon and gravel bottomed shallows for spawning and young.
Species that have evolved in dynamic environments are able to withstand the habitat changes caused by sudden events. Fresh water pearl mussels for example, bury themselves deeper into the riverbed when water levels starts to rise.

Soils

Soils are the interface between the physical Earth, habitats, species and biodiversity. Soils are a vital part of our ecosystem that directly influence what kind of plants and animals will live and grow in a given place. Soil distribution dictates vegetation cover and habitats for terrestrial ecosystems.

Soils have been developing since the last ice age ended on a range of materials, including those left by the glaciers. Distinctive geology often leads to particular soils, habitats and species. For example, the acid alpine soils of the Cairngorms and the serpentine soil on Shetland support unusual flora and fauna.

Soil properties such as texture and acidity, dictate what plants will grow. Some soils do not hold moisture well so plants growing in them have to be drought tolerant. Extreme soil conditions such as high calcium carbonate or high organic matter contents, create the unique flora of the Western Isles machair and the extensive peat bogs found throughout Scotland. Peat is a significant long-term store of the greenhouse gas carbon dioxide, so its disturbance and exploitation could have wider impacts.

Conservation

The physical Earth heritage resource holds information about the history and development of Scotland and the Earth. It also holds information about the development and distribution of native habitats and species. Geo-conservation sites of national and international importance were identified through the Geological Conservation Review process and are known as GCR sites. This review was undertaken over a twenty year period by leading scientists working across the British Isles. Many of the GCR sites they identified are protected as Sites of Special Scientific Interest (SSSIs). Some sites may receive limited protection through the non-statutory designation of a Regionally Important Geological and Geomorphological Site (RIGS).

It is important to remember that our Earth heritage does not just occur within designated sites and that habitats and species can rarely be conserved successfully without reference to the physical Earth heritage.

In order to plan for effective conservation of biodiversity, and understand its variety and mosaic, it is vital to understand the local geodiversity, and include it within the Local Biodiversity Action Plan (LBAP) process. The conservation of geodiversity is as important as that of the soil and what is living and growing on it. Examples of LBAPs where summary maps and accounts of geodiversity have been included are the West Lothian and recently published City of Edinburgh reports. An increased understanding and awareness of the links between biodiversity and geodiversity should lead to increased representation of Earth heritage in future LBAP studies.

Conclusion

Our complex biodiversity and the magnificent landscape over which it is draped only exist because of the underlying geodiversity. Scotland has evolved through varied geological processes, some of which continue to operate today. The natural landscape change that occurs today is usually related to coastal erosion or river flooding. Whilst these processes are less dramatic than those seen in the past (e.g. when volcanoes were erupting and mountains forming) they are significant for biodiversity, planning and development.

The links between the physical Earth heritage and biodiversity must be understood to enable effective management of habitats and species. Protecting a vulnerable plant or insect community from erosion by the sea will be unsuccessful if it was the erosion processes that first created the habitat niche. An understanding of the earth heritage is also fundamental to the wider goal of sustainable development because Earth heritage features and processes have created many of our important finite resources.

Earth heritage information

There are a number of organisations that can provide detailed information about the physical Earth heritage resource in your local area.

- The British Geological Survey is the government agency charged with advancing the geoscientific knowledge of the UK landmass (and adjacent continental shelf) by systematic surveying, long term monitoring and data collection. Part of their mission is ‘to meet the needs of the governmental and scientific communities of the UK’. Their 8 Scottish District Geologists are based in Edinburgh and can be contacted for advice and assistance (0131 667 1000).
- Scottish Natural Heritage has a group of Advisory staff also based in Edinburgh who have expertise in Earth Sciences. They can be approached through local SNH offices.
- The Macaulay Land Use Research Institute in Aberdeen and the Scottish Agricultural College are able to provide information on soil distribution and the relationship between land use, land cover and underlying soil.
- Staff within the Geography, Geology or Earth Science departments of local universities and colleges may also be able to help, and there are also a number of well-qualified independent experts who could provide advice on this subject.

Local RIGS groups undertake some Earth heritage conservation. There are currently RIGS groups in Fife, Lothian and Borders, Highland and Tayside. A Scottish national RIGS association is currently being set up although the UK RIGS Geoconservation Association already exists. Conservation bodies such as Scottish Wildlife Trust and the Royal Society for Nature Conservation have an active interest in geodiversity.

Further Reading

Ellis, N.V. (Ed) Bowen, D. Q., Campbell, S., Knill, J.L., McKirdy, A.P., Prosser, C.D., Vincent, M.A. and Wilson, R.C.L. (1996) *An introduction to the Geological Conservation Review*. GCR Series No 1, Joint Nature Conservation Committee, Peterborough

Thompson, A., Hine, P.D., Poole. J.S., and Greig, J. R. (1998) *Environmental Geology in Land Use Planning: A Guide to Good Practice*. Report to the Department of the Environment, Transport and the Regions by Symonds Travers Morgan, East Grinstead (80pp)

West Lothian Council (1997) *Planning for Biodiversity Action in West Lothian.* STS17 (12/97)

Edinburgh Biodiversity Partnership (2000) *The Edinburgh Biodiversity Action Plan*. Tel. 0131 529 3920 for copies.

Royal Society for Nature Conservation (1999) *RIGS Handbook*.

McKirdy A.P. and Crofts, R. *Scotland – The Creation of its Natural Landscape. A Landscape Fashioned by Geology.*

Appendix 2

Scottish Wildlife Trust Policy on Geodiversity and the Conservation of Geology and Geomorphology

Scottish Wildlife Trust

A Review of Geological interest of SWT Reserves

17 SWT reserves have SSSIs on them with geological importance, of which 10 are Geological Conservation Review Sites. As far as we know there are currently no RIGS on SWT reserves. There are, of course, many other geological features from peat bogs to waterfalls to coal measures.

Southwick – SSSI GCR – Mineral deposits.

Grey Hill– SSSI – part of a larger SSSI of Ordovician igneous pillow larvas and associated sediments.

Bawsinch Duddingston - SSSI includes part of the volcanic rocks of Arthur's Seat Volcano SSSI.

Isle of Eigg – An Scurr and Gleann Charadail - SSSI GCR – Columnar pitchstone of the Scurr.

Kilminning Coast – SSSI – part of a SSSI with Lower Carboniferous calciferous sandstone with fossil molluscs and plants.

Ballagen Glen SSSI – classic section of Carboniferous Cementstone Group.

Petershill – SSSI – Carboniferous limestone with fossils.

Rahoy Hills – SSSI GCR – complete Upper Cretaceous succession.

Isle of Eigg – Laig to Kildonnan – SSSI GCR – Cretaceous reptile deposits (best British site) – Bathonian delta deposits with fossiliferous shales.

Longhaven Cliffs – part of a SSSI of granite cliffs showing coastal erosion features.

Seaton Cliffs – SSSI GCR – Upper Old Red Sandstone coastal features.

East Lammermuir Deans - SSSI - physiographic - steep walled glacial gorges.

Flanders Moss - SSSI GCR – part of the GCR site of Quaternary landforms in the Upper Forth valley.

Hoselaw Loch – SSSI GCR – part of the Quaternary peat site (Din Moss) with a well studied and complete pollen stratigraphy.

Montrose Basin – SSSI GCR – stratigraphy of glacial deposits.

Spey Bay – SSSI GCR – part of a GCR site with active shingle ridges, delta and fossil coastal ridges.

Stormont Loch – SSSI GCR – kettlehole loch with well studied glacial pollen stratigraphy.

Dr Alastair Sommerville, Senior Biodiversity Co-ordinator, May 2001

Appendix 3

Scottish Wildlife Trust Policy on Geodiversity and the Conservation of Geology and Geomorphology

A development strategy for the RIGS movement in Scotland 2000-2005

Introduction

For its size, Scotland has some of the most varied geology in the world. When this varied geology is coupled with landforms shaped by past ice ages, soils which reflect underlying geology and previous climates, and river and coastal landforms which are still being shaped today, the breadth and depth of Scotland's remarkable Earth history is revealed. With such a fascinating country, it is little wonder that the science of geology first developed here and that people continue to be interested in and inspired by Scotland's very foundations.

Some of Scotland's nationally and internationally important geological and geomorphological sites are designated as Sites of Special Scientific Interest (SSSI) under the Wildlife and Countryside Act (1981). They have some statutory (legal) protection from damage. The sites that comprise the SSSI network were identified following a nationwide review process called The Geological Conservation Review (GCR). These sites are acknowledged to be of national importance, with some being internationally important. In Scotland, some sites identified as part of the GCR have not been designated as SSSIs and are referred to as GCR sites. In addition, there are many other Earth science sites which are important for their role in research, local history and culture, education and landscape, but which are currently unprotected. Conserving these vulnerable and undesignated sites so they are available for others to enjoy and study both now and in the future, is an important goal.

Expanding the network of non-statutory (no direct basis for site protection within the law) or voluntary Earth science sites, collectively called Regionally Important Geological/ Geomorphological Sites or RIGS, offers a realistic way of achieving protection for such vulnerable Earth science sites in Scotland.

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Future development of the RIGS intitiative in Scotland

The progress and future development of the RIGS initiative in Scotland is entirely dependent on the membership. There are, however, other bodies sympathetic to Earth Science conservation who could be willing to enter into partnerships or offer an expertise exchange. Whilst RIGS is voluntary, there are a number of national and local government bodies pertinent to their work: Local Authorities, particularly the planning service and officers involved in Local Biodiversity Action Plans (LBAP) and Local Agenda 21; the British Geological Survey and Scottish Natural Heritage. Many Ranger Services are run by local authorities.

Non governmental organisations such as The Scottish Wildlife Trust, National Trust for Scotland, The Woodland Trust and The Royal Society for the Protection of Birds are also potential partners, as are landowners and tenants (represented by bodies such as the Scottish Landowners Federation and Scottish National Farmers Union). Local community associations are also very important.

Public understanding of Science, and Education in general, are prime drivers for selection, notification and development of sites. Partnerships with individual schools and universities and with representative bodies such as ESTA (Earth Science Teachers Association) and SAGT (Scottish Association of Geography Teachers) are likely to be beneficial, and many museums are skilled in this field. Special interest groups include the Royal Society for Nature Conservation's 'Rockwatch' club, the Royal Scottish Geographical Society, the British Geomorphological Research Group and the Quaternary Research Association. RIGS groups are encouraged to establish partnerships with those organisations relevant in their local context.

Strategies and Policies for RIGS in Scotland

Policies for the development of RIGS in Scotland are identified below. The strategies to help achieve this are identified below.

Policy 1. Complete RIGS group coverage of Scotland by 2005
- Increase the number of Earth scientists interested in, and involved with RIGS
- Involve industry in RIGS groups
- Target students in further and higher education who are interested in Earth science and conservation
- Increase the awareness and involvement of special interest groups in the RIGS process
- Increase the awareness and involvement of local authority planners and staff involved in biodiversity and sustainability

Policy 2. Increase the number of Scottish RIGS sites and widen their subject range
- Develop and promote standardised recording and notification procedures for RIGS sites in cnjunction with UKRIGS
- Undertake flagship designations
- Review the site audit list at the same frequency as Local Authority 'Local Plan' reviews
- Establish a central record of RIGS site location, interest, importance and vulnerability
- Reflect the importance of geography, geomorphology, geology and soils in schools and universities through increased RIGS sites for Education

Policy 3. Increase skills base within RIGS groups
- Enter partnerships with national organisations and exchange expertise.
- Involve local associations interested in subjects such as industrial heritage or natural history
- Seek and develop training in skills such as practical site work, health and safety and interpretation

Policy 4. Increase community participation and involvement in RIGS
- Undertake RIGS designations with the consent of landowner
- Increase community consultation prior to designation
- Promote community site adoption
- Participate in high profile local initiatives
- Involve local volunteers in site conservation work
- Promote public access and awareness

Policy 5. Improve site management and development
- Assist landowners in site management and development
- Involve local volunteers for site work and management
- Improve Earth science site interpretation through the use of posters, leaflets, trailboards etc
- Undertake site management where appropriate

Policy 6. Increase involvement in planning process
- Improve links with Local Authority planners and seek status as consultees for issues relating to Earth science conservation
- Demonstrate the importance of Earth science through links to the Biodiversity Action Plan process, Local Agenda 21 and the Scottish Biodiversity Group

Policy 7. Increase funding
- Ensure groups operate appropriately with constitutions, bank accounts and minute keeping
- Investigate constituting groups as charities
- Participate with UKRIGS and RSNC who secure funds for RIGS at a national level on behalf of local groups
- Apply for grants from existing grant providers such as Scottish Natural Heritage and the Curry Fund of the Geologist's Association

Policy 8. Establish by 2001 a Scottish body to provide a forum for networking, skills exchange between RIGS groups and monitoring progress
- Complete the work of the steering group set up to investigate the need for a Scottish geoconservation association

- Consult Scottish RIGS groups, and constitute body if deemed appropriate by the membership
- If constituted, the body should monitor progress towards the implementation of 'The Development Strategy for the RIGS Movement in Scotland 2000-2005'